

Northumbria Research Link

Citation: Sillence, Elizabeth, Briggs, Pamela, Fishwick, Lesley and Harris, Peter (2006) A framework for understanding trust factors in web-based health advice. International Journal of Human-Computer Studies, 64 (8). pp. 697-713. ISSN 1071-5819

Published by: Elsevier

URL: <http://dx.doi.org/10.1016/j.ijhcs.2006.02.007>
<<http://dx.doi.org/10.1016/j.ijhcs.2006.02.007>>

This version was downloaded from Northumbria Research Link:
<http://nrl.northumbria.ac.uk/id/eprint/3829/>

Northumbria University has developed Northumbria Research Link (NRL) to enable users to access the University's research output. Copyright © and moral rights for items on NRL are retained by the individual author(s) and/or other copyright owners. Single copies of full items can be reproduced, displayed or performed, and given to third parties in any format or medium for personal research or study, educational, or not-for-profit purposes without prior permission or charge, provided the authors, title and full bibliographic details are given, as well as a hyperlink and/or URL to the original metadata page. The content must not be changed in any way. Full items must not be sold commercially in any format or medium without formal permission of the copyright holder. The full policy is available online: <http://nrl.northumbria.ac.uk/policies.html>

This document may differ from the final, published version of the research and has been made available online in accordance with publisher policies. To read and/or cite from the published version of the research, please visit the publisher's website (a subscription may be required.)



**Northumbria
University**
NEWCASTLE



UniversityLibrary

A framework for understanding trust factors in web based health advice

Elizabeth Sillence ^a, Pam Briggs, ^a Peter Harris ^b & Lesley Fishwick ^a

^a PACT Lab, School of Psychology and Sports Science, Northumbria University, Newcastle upon Tyne, NE1 8ST, UK

^b Centre for Research in Social Attitudes, Psychology Department, Sheffield University, Sheffield, S10 2TP, UK

Author for correspondence

Elizabeth Sillence

PACT Lab, School of Psychology and Sports Science, Northumbria University, Newcastle upon Tyne, NE1 8ST, UK

Telephone + 44 191 243 7246

Fax + 44 191 227 3190

Email Elizabeth.sillence@unn.ac.uk

Abstract

Trust is a key factor in consumer decisions about website engagement. Consumers will engage with sites they deem trustworthy and turn away from those they mistrust. In this paper we present a framework for understanding trust factors in web based health advice. The framework is derived from a staged model of trust and allows predictions to be made concerning user engagement with different health websites. The framework is then validated via a series of qualitative, longitudinal studies. In each study genuine consumers searched online for information and advice concerning their specific health issue. They engaged in free searching and were directed towards sites previously reviewed using the framework. Thematic analysis of the group discussions provided support for the framework and for the staged model of trust wherein design appeal predicted *rejection* (mistrust) and credibility of information and personalisation of content predicted *selection* (trust) of advice sites. The results are discussed in terms of the merits of the framework, its limitations and directions for future work.

Keywords: Trust, credibility, health, social identity, internet, computer mediated communication, framework

1. Introduction

The rapid growth of the Internet has brought with it renewed interest in the notion of trust. Within the field of e-commerce especially people began to realise that trust is vital to making online purchases (Cheskin, 1999). The realisation that design can affect the trust of a user has had implications for user interface design, web sites and interactivity in general (Nielson, 1999). This has led in turn to increased discussion in fields such as Human Computer Interaction (HCI), Computer Supported Cooperative Work (CSCW), agent systems and ambient intelligence about how to encourage, maintain, and increase trust between people and machines and between users themselves (e.g., Cheskin, 1999 ; Schneiderman, 2000 ; Olson & Olson, 2000a ; Wang & Emurian, 2005; Corritore, Kracher & Wiedenbeck, 2003; Riegelsberger, Sasse & McCarthy, 2005; Derbas, Kayssi, Artail & Chehab, 2004; and Marsh, Briggs & Wagealla, 2004).

One area of Internet use in which trust is key is that of online advice. Online advice takes many different forms from static advice pages and personalised calculators to interactive chats with domain experts. In recent years health advice has gained increasing prominence. The availability of sites, the speed of access to information and advice and the anonymity it affords makes the Internet an attractive proposition for gathering advice on health. However the expanding volume of sites coupled with fears over the quality of information has led to questions being raised about how people make trust decisions with regard to online health sites. This paper presents a framework for understanding trust factors in online health advice. The concept of trust is explored and a staged model of trust is presented. The paper begins however with a brief overview of the Internet and health advice.

2. Using the Internet for health advice

It has been reported that 80% of adult Internet users have gone online for general health information (Fox & Fallows, 2003). People search online for health information and advice for a number of reasons. Some people want to be better informed, better prepared when meeting the doctor, or are searching for support, alternative answers or reassurance (Rozmovits and Ziebland, 2004). Time constraints in the consulting room have also led to an increase in online searching. The average length of an appointment with a family practitioner in the UK is currently about eight minutes. In this short period of time both the doctor and the patient often find it difficult to explain and discuss all their issues. Patients often think doctors do not give them enough information to make sensible choices about how they want to be treated (Carvel, 2005) and they often find it difficult to recall the specifics of their discussions with the doctor after the consultation (Kalet, Roberts & Fletcher, 1994).

The appeal of the Internet is particularly strong for those people who wish advice on important but sensitive matters (Klein & Wilson, 2002) and many people searching online for health advice believe that it will enable them to better deal with their health and will convey health benefits (Mead, Varnam, Rogers & Roland, 2003). However less than half of the medical information available online has been reviewed by doctors (Pew, 2000) and few sites provide sufficient information to support patient decision-making with many also heavily jargon-laden and difficult to read (Smart & Burling, 2001).

Assessing the quality of information online is a daunting task not least because the range of health topics and the number of different websites is so enormous. It is not only the health topics that vary widely but also the nature of the websites themselves. There are variations in authorship, scope and features. In a recent review, Petit-Zeman (2004), examined some of the health resources currently available online. She noted that sites ranged from those designed and supported by a series of individual patients through to internationally renowned charity sites. Large-scale survey data has indicated that people seek health advice across a range of different websites (Sillence & Briggs, in press). Table 1 indicates the range of health advice websites available to consumers.

<table 1 about here>

The websites described in table 1 are by no means exhaustive but provide an indication of the type of information and advice available on different sites. The nature of health websites varies depending on the provider and the health issues itself. There is also considerable overlap between the types of sites in terms of content. Within these sites the types of information and advice varies. Some sales sites for example contain a lot of patient information, news and commentary in addition to their commercial aspect. Some pharmaceutical sponsored sites also contain interactive elements such as discussion boards as well as implicitly or explicitly selling their brand.

2.1 Assessing the quality of online health information

The large variation in health websites has provided ample opportunity for health website evaluations to take place. These evaluations predominantly assess the quality of the online health information from a purely medical perspective and have included topics as diverse as depression, sildenafil citrate (viagra) and the menopause (Griffiths & Christensen, 2000; Eysenbach, 1999; Reed & Anderson, 2002). In a large scale meta-review of health website evaluations, Eysenbach, Powell, Kuss & Sa (2002) noted that the most frequently used quality criteria included accuracy, completeness and readability. *Accuracy* referred to the degree of concordance of the information provided with the best evidence or with generally accepted medical practice. *Completeness* was generally calculated as the proportion of a priori-defined elements covered by the website. *Readability* formulas were also used to establish the reading level of a document. In their review, the authors noted that 70% of the studies concluded that quality is a problem on the Internet.

Several other indicators of quality have been suggested. These include seals of approval or trustmarks such as the Health On the Net foundation (HON) code and the use of privacy policies. Seals of approval have been suggested as a strategy to help consumers in identifying high quality information. Most seals act as proxy indicators of quality by requiring websites to, for example, disclose any commercial interests they might have. The codes, however, do not offer any direct assessment of content. Unfortunately the presence of such codes and awards appears to have no significant effect on the credibility or retention of health information on a web page (Shon, Marshall & Musen, 2000). Furthermore, consumer expectations of such health seals are often incongruent with practice (Burkell, 2004). Other researchers have been interested in empowering health consumers to judge the quality of the information

they find on the Internet for themselves. Sue Childs (2004) and colleagues developed two sets of guidelines to help both consumers and information providers. Their Judge project (www.judgehealth.org.uk) provides guidelines for support groups on how to produce good quality information and guidelines for consumers on how to judge the quality of a website. These guidelines are particularly helpful for consumers because they recognise the importance of alternative sources of advice, for example, support groups, which may differ from traditional medical opinion and advice.

Kathleen Murray (2001) at the University of Alaska also proposes a set of five criteria for analysing the quality of a health website. In addition to the criteria identified by Eysenbach et al (2002) in their review, Murray highlights the importance of the privacy policy of the website. She suggests that users should note whether or not the site has a policy and if so what it says about the company's use of personal data. Murray's inclusion of privacy policies as a criteria for assessing health website quality highlights a key difference between medical assessments of website quality and what we know about how genuine consumers search for, appraise and use health advice. Eysenbach & Kohler (2002) noted that despite participants identifying, prior to a search task, the importance of privacy policies in their assessment of health websites during the study itself not a single participant actually noted whether or not the sites they used even contained a privacy policy. The quality indicators suggested by medical evaluations of sites do not appear to map directly onto trust indicators used by genuine health consumers. Even within the quality assessment literature itself discrepancies exist. Reed & Anderson (2002), for example in their assessment of the quality of menopause information available online recommend pharmaceutical sites in terms of providing the most accurate information. Accuracy is of course a key marker of quality. The Judge Project (Childs, 2004) however warns consumers away from pharmaceutical sites because of their potential for biased information.

So despite this body of research concerning the quality of online health advice very little is known about how genuine health consumers actually seek advice. We know, however that ordinary consumers search for and appraise information in a different way to medical experts or health informatics professionals. They are more likely to be influenced by the attractiveness of the design (Standford, Tauber, Fogg & Marable, 2002) and they will begin their search for advice from a general information portal (Briggs, Burford, De Angeli & Lynch, 2002) – which means that they gain access to information indiscriminately.

The trust cues that health consumers use are likely to overlap to a certain extent with the quality markers many medical evaluations suggest. However there will be differences. Some of the likely candidates for trust cues are simply missing from or underplayed in the quality evaluation literature. This is partly due to the nature of the sites considered in such reviews. Personal websites often containing little or no medical input are often excluded from evaluation studies. Likewise those containing more interactive features such as message boards are often disregarded. Another reason that consumers' trust indicators are likely to differ from the quality assessment literature is that quality evaluations do not take into account the differing needs of the consumers' or the stage at which they are engaged with the site. Different trust cues are likely to be important at different stages of engagement with health websites. The issue of trust is explored in the next section.

3. Trust issues in online health advice

The literature regarding trust in an e-commerce setting provides a useful starting point for exploring the ways in which people evaluate the trustworthiness of health information and advice online (see Grabner-Krauter & Kaluscha, 2003 for a recent review.) Based on this literature we can assume that various factors are likely to govern the extent to which individuals feel they can trust health advice online. Firstly, they may be influenced by the look and feel of the site – trusting, for example, those sites rated high in visual appeal and mistrusting those sites with poor visual design or with unprofessional errors. Secondly, they may be influenced by the branding of the site or by presence of familiar images or trusted logos. Thirdly, they may be influenced by the quality of information available on the site, trusting those sites with greater perceived expertise, and fourthly, they may be influenced by the extent to which the advice is personalised to the individual – i.e. the extent to which the advice appears to come from and be directed to similar individuals (i.e. those with a shared social identity).

Whilst these different factors appear to be important, researchers disagree over their relative importance in fostering trust. For example, some researchers argue that consumer trust (or a related construct, credibility) is primarily driven by an attractive and professional design (Fogg, Kameda, Boyd, Marchall, Sethi, Sockol & Trowbridge, 2002; Standford et al, 2002, Kim and Moon, 1998) or is influenced by the presence or absence of visual anchors or prominent features such as a photograph or trust seal (Riegelsberger, Sasse & McCarthy, 2003). Others argue that trust reflects the perceived competence, integrity predictability and/or benevolence of the site (Bhattacharjee, 2002; McKnight & Chervany, 2001). A few authors also highlight the importance of personalisation in the formation of trust judgments (Briggs, De Angeli & Simpson, 2004) or the notion of good relationship management (Egger, 2000).

A number of different models exist, primarily within the field of e-commerce that attempt to define and operationalise trust its antecedents, components and consequences. Corritore et al (2003) identify three perceptual factors that impact upon online trust: perception of credibility, ease of use and risk. They also identify *external factors* which may affect trust judgements. These external factors may include the context of the transaction and the characteristics of the trustee (e.g. web site design). Wang & Emurian (2005) identify four types of trust including interface design features which again share some common ground with the features presented above i.e. structure design (the look and feel of the site) content design (inclusion of security and privacy policies seals of approval or third party certificates) and social cue design (photographs and other indicators of social presence).

The different models of trust that currently exist contain a number of common and distinct features. One feature that some of the models allude to although few if any detail explicitly is the notion of the way trust develops over time. Riegelsberger et al (2005) in their model of trust describe different stages of trust that develop over time: early, medium and mature forms of trust. These concepts however are not included in their model diagram yet it is worth distinguishing between the kinds of trust that support transient interactions and those that support longer-term relationships. If one considers trust in this developmental context then some of the findings in the literature make more sense. In particular, consideration of a developmental context

helps to reconcile the tension between those models of trust which suggest that it is a concept grounded in careful judgment of institution and process factors such as vendor expertise and experience, predictability, degree of personalisation and communication integrity and those models that suggest trust decisions rely more heavily on the attractiveness and professional feel of a site.

4. A staged model of trust

A staged model of trust makes it possible to distinguish between relatively 'hasty' and more 'considered' processing strategies for the evaluation of trust in high and low risk environments. Chaiken (1980) identified two processing strategies by which an evaluation of trustworthiness may be made: firstly a heuristic strategy which follows a 'cognitive miser' principle - where people base decisions on only the most obvious or apparent information; and secondly, a systematic strategy that involves the detailed processing of message content. A number of other studies in the persuasion literature support the two-process model, namely that people use cognitively intense analytical processing when the task is an important or particularly engaging one, whereas they use affect or other simple heuristics to guide their decisions when they lack the motivation or capacity to think properly about the issues involved (e.g. Petty & Wegener, 1999; Chen & Chaiken, 1999).

The process does not stop there however, and a more realistic assessment of the development of trust should include a third stage in which a trusting relationship develops between the consumer and the website. This final stage has been rather overlooked in the trust literature, although it was originally proposed in the Cheskin/Sapient report (1999) and also appears in MoTEC (a Model of Trust for E-Commerce) (Egger, 2000, 2001) where the authors described a stage of trust maintenance. There is however, little empirical evidence for a staged model of trust in e-commerce quite simply because most published studies of trust do not investigate the act of trusting, but rather investigate the intention to trust (Briggs et al, 2004).

Stage 1: First impressions and heuristic analysis

The heuristic-systematic processing model described earlier suggests that people will employ very different processing strategies when evaluating trust in high versus low risk or high versus low involvement situations. Thus people will use cognitively intense analytical processing when the task is an important or particularly engaging one, whereas they use affect or other simple heuristics to guide their decisions when they lack the motivation or capacity to think properly about the issues involved (e.g. McAllister (1995); Petty and Wegener, 1999; Albarracin and Kumkale, 2003).

Such studies anticipate some recent findings with regard to online trust and credibility. Stanford et al. (2002) invited experts and ordinary consumers to view health and finance information sites and found that experts (those having a high involvement with a site) were highly influenced by factors such as reputation, information quality and source and perceived motive, in contrast to ordinary consumers (having a low involvement with the site) who were much more influenced by the attractiveness of site design. However these two processes do not simply reflect personal involvement, but can also reflect the amount of time people have to give to an evaluation. Thus, in an online context, people are often required to sift through vast quantities of information – much of it irrelevant – before exploring one

or two sources of information in more depth. Once again, the processing strategies used to sift information quickly should involve low cognitive effort (heuristics) while those involved in longer term evaluation are likely to be more effortful, analytic processes.

Faced with a vast array of information it is likely that people and in particular unmotivated students or people under time pressures will fall back on heuristic processes. Sillence, Briggs, Fishwick & Harris (2004c) have shown that this rapid screening is very effective in the initial stages of contact with a health website. Within a thirty second window, participants were able to efficiently sift information – recognizing and rejecting general portals and sales sites quickly. This may be because such sites have distinctive design features associated with them, but some content processing is also underway. Again within the health domain specifically, Peterson, Aslani & Williams (2003) explored consumer experiences in searching for and evaluating information on medicines online. They found that participants reported quickly rejecting sites that were slow to load, that contained too many graphics and that had pop-up advertisements. Social cues are also important in the design of trustworthy websites. Appropriate graphics and photographs can add to a sense of social presence and inclusion whilst inappropriate mission statements or alienating language can have the opposite effect (Wang & Emurian, 2005).

Stage 2: Further involvement with the site and careful evaluation of site content

Studies which have involved real consumers or have involved more protracted engagement with a site or that have asked customers about the general principles underpinning e-commerce transactions have generated a family of trust models with reasonable agreement. In general the models suggest that trust which supports online engagement is influenced by perceived integrity and expertise, predictability or familiarity of content and reputation (e.g. Bhattacharjee, 2002; Briggs et al., 2002, study 2; McKnight and Chervany, 2001).

In the health domain, Peterson et al. (2003) found that consumers' opinions on credible sources of information on medicines varied with some participants viewing pharmaceutical companies as the 'official' information on a medicine and others preferring what they considered to be more impartial sources such as government organisations and educational establishments. Perceptions of impartiality vary according to the health domain but remain a key factor in predicting trust.

In a large scale study of credibility conducted at the Stanford persuasion laboratory, over 1400 participants completed a questionnaire concerned with those factors they felt made web sites more or less credible (Fogg, Marshall, Laraki, Osipovich, Varma, Fang, Paul, Rangnekar, Shon, Swani & Treinen, 2001). The authors found that "commercial implications" of a website negatively affected its perceived credibility. Users penalised sites that had an aggressive commercial flavour. This included sites which required a paid subscription to gain access or sites which had a commercial purpose as opposed to an academic purpose. Conversely sites which convey expertise through the inclusion of authors' credentials and references were viewed in a positive light. External links to outside materials and sources were also seen favourably as evidence of the site's honest and unbiased intention. Within a health context however, perceptions of credibility research suggests that perceptions of credibility in relation to commercialism may be more flexible and are highly dependent on topic

and content. Walther, Wang & Loh (2004) found that the presence of advertising on health websites only had a deleterious effect on the credibility of sites with .org domain. It actually had a positive effect on .com and educational domains (.edu).

Stage 3: Subsequent relationship development and integration

As previously mentioned few studies within the e-commerce trust literature have looked at longer term relationships between consumer and website. One notable exception is the work of Florian Egger (2000, 2001). In his studies of online customers, good personalised communication between customer and vendor was shown to be vital to the development of trust. In a large scale study of credibility, Fogg et al (2001) found that ‘tailoring’ of content increased the credibility of websites. Tailoring included factors such as ‘the site sends emails confirming the transactions you make’, ‘the site selects news stories according to your preferences’, ‘the site recognizes that you have been there before’ and ‘the site requires you to register or log in’.

Some studies within the health domain have examined people’s motivations for continued use of the Internet. Rozmovits and Ziebland (2004) noted that in cancer patients long term support was the key factor. The Internet was often used to share experience and advice, and to contact support groups and chat rooms. The online community literature also suggests that long term relationships online are based upon a sense of trust which develops through the exchange of personal information. The users’ ability to both generate their own content and personalise received content is important in any longer term engagement with a website.

5. A framework for understanding trust factors in health websites

<Figure 1 about here “The staged model of trust”>

The staged model of trust as represented in Figure 1 provides the basis from which to develop a framework for understanding trust factors in health websites. The framework should help to categorise different types of health website and to enable predictions to be made regarding use and engagement. The framework consists of three categories: heuristic analysis, content evaluation and longer-term engagement. The categories relate to the stages of the trust model and can be split into a number of dimensions. The dimensions are derived from the literature, in particular from the work on online trust by Briggs et al (2002). Her work draws upon sources such as Egger’s (2002) MoTEC model. In addition the dimensions are influenced by the work of Corritore et al (2003) on trust cues and the work of Fogg and colleagues (Fogg et al 2001; Standford et al 2002) looking at the effect of design issues upon credibility. Although it is anticipated that there will be many standard trust markers for all online advice, the dimensions included in the framework appear to be directly relevant for the health domain. The health specific issues are influenced by early pilot focus group work which highlighted site purpose, commercial overtones and personalisation as key concerns. The framework is presented in table 2 and we consider each dimension in more detail below:

<Table 2 about here>

Heuristic analysis:

This refers to the look and feel of the site and to its fundamental design features. At this stage the aim of the website should be to provide the right cues to content.

Visual appeal: The correct balance between text and graphics is important as too much text is difficult to read and too many graphics make the site slow to load and do not provide enough cues as to the content of the site. The use of colour is also important and can alter the mood of the site as well as making it more or less easy to read.

Layout/navigation: The layout is vital in terms of making a good first impression. The user needs to be able to latch onto the relevant areas of the site and to be able to start to navigate the site straight away. Navigation should take the form of simple menu bars and larger websites should include a site map.

Social identity cues: These cues include the use of appropriate graphics and photographs, mission statements and language. These cues signal to the user that they have found a site that will be of specific interest to someone like themselves.

Adverts: Too many adverts can be distracting for the reader, they also signal the extent to which the site is commercialised.

Branding: The level of branding varies across sites. Branding provides the user with a sense of familiarity and predictability and can act as a reputation mechanism. Strong branding includes brand colour, name and logo whilst moderate branding may contain a selection of these features.

Systematic evaluation of site content:

Language style and tone: The style and tone of the language on the website is important. Some websites have a more medical and technical tone whilst some are more or less formal. Some sites contain a great deal of medical jargon. This can be off putting for someone new to the disease or condition but can be entirely appropriate for a knowledgeable patient. Other websites, especially those written by individuals, are often more informal in tone and include references to the first person. The tone of the language gives an indication as to the nature of the website as a whole and can be manipulated to suit the needs and motivations of the author e.g. to provide feelings of inclusiveness.

Site purpose: The site's purpose can be explicit or implicit and can range from raising funds for a charity, selling products or services on a commercial site, to information provision on a government site or experience sharing on an individual site. The site can exist for advertising purposes, public relations or simply to maintain a web presence for the organisation.

Content level: The level of the information on a website should be aimed at the intended audience. The content can be surface deep and intended for a beginner's search (someone new to the subject or someone just wishing to find out more about the subject) or could be more specialised and in-depth for a more knowledgeable audience.

Source knowledge: The knowledge or expertise of the website author could be medical or could be the expertise of a patient or carer.

Cross-referencing: The web is all about links between pages and sites. Sites that allow you to follow areas of interest through cross-referencing and external links are often more in depth than non-linked sites. Links also convey a sense of openness.

Longer-term engagement through source integration and self-disclosure processes

Personalised content: Content can either be generic or personalised. In order to be personalised the user has to disclose some personal information about themselves. This can take the form of registration or creating a personal profile or can be on a piecemeal basis as and when the need arises.

Interactivity: An interactive site allows the user to engage with the site. Health quizzes, tools, 'ask the expert' features and chat circles allow the user to interact with the site. Email and text updates help to maintain the user's interest and commitment.

Updated content: In order for users to keep returning to the site it is important to ensure that the content is regularly updated. New features and content items can be added periodically. This ensures that the user engages in longer-term consultation with the site. It also makes it more likely that the user will integrate the information across other sources, for example, other sites and offline sources such as friends, family and health professionals.

User generated content: One way of ensuring longer-term engagement with a site is to allow the users themselves to generate the content of the website. This involves a degree of self-disclosure on the part of the user. Users can read and post messages for other users to see. Usually sites require that users register and provide their details before allowing them to post messages.

6. Validating the framework

In order to validate the framework and assess the extent to which it predicts consumer trust in online health sites a number of sites were reviewed and analysed in terms of the framework. In this paper a number of predictions on the basis of the framework are made and then assessed by directing genuine health consumers towards these sites (amongst others) during a series of longitudinal studies. Other large-scale quantitative validation is also currently under way (Sillence et al, in preparation). This section begins with an overall introduction to the nature and type of health websites before assessing eight specific sites in terms of the framework. The trust predictions based upon the framework are outlined and then the methodology is described. The results are presented in section 7.

6.1 HEALTH WEBSITES

The eight examples presented below are taken from across four different health domains. The health domains themselves were chosen to cover a range of ages and risk levels and were designed to include both male and female participants. The topics were hypertension, the menopause and Hormone Replacement Therapy (HRT), the Measles, Mumps and Rubella vaccination (MMR) and healthy living. The sites of interest in this study were chosen to reflect the range of sites actually used by consumers (as reported in Sillence & Briggs, in press) in terms of site provider and the nature of information and advice offered. A brief description of each website is followed by table 3 which provides an overview of the key features of the sites. Finally each website is analysed in terms of the framework in table 4.

6.1.1 Hypertension

Heart center online <http://www.heartcenteronline.com/myheartdr/home/index.cfm>

Heart center online is an American site and contains different forms of advertising including banner ads and sponsored newsletters.

DIPEx <http://www.dipex.org/>

DIPEx (see figure 2) is a database of personal experiences of health and illness, produced by an Oxford (UK) based charity and published on a freely accessible website and on DVDs. The high blood pressure condition is just one of the conditions featured on the website.

<insert figure 2 about here “ Screenshot of the hypertension page on DIPEx website”>

Figure 2 highlights some of the key features of the website with respect to the trust evaluation framework. The site is well balanced in terms of text and graphics and is free from adverts (although there is a button requesting donations). There are a variety of features present including a question and answer section and links to experiential content.

6.1.2 HRT and the menopause

Menopause matters www.menopausematters.co.uk

An independent clinician led site on the menopause and HRT. It is UK based and is run by a team of mostly female doctors and consultants.

Solvay healthcare <http://www.hrtinfo.co.uk/pages/homepage.asp>

The site is owned by Solvay Healthcare a pharmaceutical company. It covers the menopause with a strong focus on HRT. The site contains links to support groups.

6.1.3 MMR vaccination

MMR the facts www.mmrthefacts.nhs.uk

A UK Government site providing information and advice regarding the MMR vaccination.

Jabs www.jabs.org.uk

A support group for parents concerned about the MMR vaccination. The site provides information and advice on alternatives to the combined vaccination.

6.1.4 Healthy living

BBC healthy living http://www.bbc.co.uk/health/healthy_living/

Sub section of the BBC's website. Contains six sections on aspects of healthy living and a link to relevant message boards.

Health A to Z <http://www.healthatoz.com/healthatoz/Atoz/default.jsp>

A US based site covering a wide range of health and lifestyle issues. The site contains a series of health management tools and membership benefits.

<insert table 3 about here>

Table 4 shows the framework and its dimensions in relation to the eight websites reviewed. The framework allows a number of predictions to be made regarding the level of consumer engagement with each of the sites.

<insert table 4 about there>

6.2 Predictions based on the framework

Rejection at heuristic analysis stage

If website first impressions are as important as previous studies suggest then we would expect sites with poor design and poor visual appeal to be rejected at the heuristic analysis stage. The **heart center online** site is also likely to be rejected upon heuristic analysis. The site contains a great deal of adverts which lead the user to consider the commercial implications of the web site. There are three menus on the homepage making it difficult to see a clear entry point for the site. The fact that users have to register in order to receive more detailed content is also likely to increase rejection at the heuristic stage. The framework would also predict the rejection of the **Health A-Z website** upon heuristic analysis. At first glance it is not clear who the intended users of the site are. There are very few social identity cues on the homepage or elsewhere. There are multiple navigation methods and several unexplained menu tabs e.g. managers and channels. Users clicking upon the majority of tabs or buttons are faced with a request for a member login.

Rejection at content evaluation stage

Sites that participants choose to engage with in more depth are then subject to content evaluation. Site content evaluation focuses far more heavily on the content factors of the site. Participants that do not reject sites at the heuristic stage may well go on to develop a longer term relationship with the site. The framework enables predictions to be made regarding which sites participants will engage with over the longer term. The **menopause matters** website contains generic information and advice rather than personalised advice which may prevent a longer term relationship from developing. The **Solvay healthcare** site appears to be a useful resource providing up-to date information, a FAQ section and interactive elements such as letters to the editor and a monthly poll. The site is however owned by a pharmaceutical company and it may be that the website's purpose and intentions impact upon the development of any longer term consumer engagement. The **MMR the facts** site contains a great deal of information and advice but lacks any real interactive features. The Q & A section on the site represents an amalgamation of parents' questions and there is no facility for more interactive engagement between parents or between parents and doctors. The **BBC's healthy living** site contains surface level information and generic rather than personalised information or advice. The message boards are also generalised and this may make the site less useful in the longer term. The **Jabs** website also contains generic rather than personalised information and advice. The level of expertise displayed on the site is also unclear and the information is very one-sided which may be off putting to some users. However the site contains features which could well encourage longer term engagement. The site contains regular news updates, message boards and invitations to take part in specific campaigns.

Longer term engagement

The **DIPEx** site contains experiential content that users may well identify with as well as message boards which allow relationships to develop between like-minded members.

6.3 Method

The framework was assessed using a novel methodology developed to investigate how genuine consumers search for and appraise health information and advice online. The methodology is described in more detail in Sillence et al (2004a). In total 40 participants (30 females and 10 males) took part in four separate studies focussing on four different health topics. Despite including one solely female health topic it was anticipated that the final sample would have been more balanced. We can only assume that the gender bias in our sample reflects the higher female interest in health advice within an online setting that has been noted in other studies (Pew, 2000; Briggs et al, 2002) and thus were more willing and committed to take part in the longitudinal study.

The methodology used was the same in each study. Participants were invited to attend a total of four 2-hour sessions at Northumbria University, UK. During all four sessions, participants used the Internet to search for information and advice on the health topic in question, followed by a group discussion with a facilitator. Participants were told to freely surf the web during sessions 1 and 4, and were directed to specific web sites during sessions 2 and 3 including those described in section 6.1. These specific sites were chosen for their trust design elements and to reflect the range of sites actually used by consumers. Participants could spend as little or as long as they wished on each site and were asked to discuss their level of engagement with the sites and their reasons for trusting or not trusting the site and its contents. At the end of the fourth week the participants were given diaries in order to record their ongoing information and advice searches over a six-month follow up period. During each phase of the study a number of different records were taken:

Phase 1: Participants' actions online were automatically logged. All the websites visited by the participants were logged and the amount of time spent on each site was recorded. Secondly (and concurrently) participants engaged in verbal protocols or 'thinking aloud' as they searched through some of the sites. Thirdly, the participants were asked to record their perceptions of each site visited in a logbook and use this information during subsequent discussion sessions. Fourthly, following the online period, participants engaged in guided group discussion using themes piloted during earlier focus groups. The discussion guide covered the following main areas: 1) current information sources, 2) search strategies, 3) trusted and mistrusted websites, 4) first impressions and 5) revisiting websites.

Phase 2: At the end of the fourth week the participants were given diaries in order to record their ongoing information and advice searches both online and offline. Participants kept these diaries over a six-month period. Following the return of the diaries the participants in the menopause/HRT study were invited to take part in a final, follow-up interview. This structured interview provided an opportunity to follow up on the information in the diaries and to ask the participants which sites they

had been using, which they trusted and why. It also allowed further exploration of participants' integration of information across online and offline sources.

Results

The results for each phase of the study are described below along with the forms of data analysis undertaken. All the discussions and verbal protocols from phase 1 were recorded on audiotape and then transcribed. The transcripts were scrutinized for extracts describing trust and mistrust and then were coded by one member of the research team under several anticipated themes (for example, first impressions of websites, source credibility) and emergent themes (such as social identity markers and mistrust and confusion surrounding risk information). Then at least one other research team member read the transcripts and considered the codes. Constant comparison was used in the analysis to ensure that the thematic analysis represented all perspectives. Discrepancies between coders were resolved through discussion and mutual agreement before analysis.

In phase 2 the diaries were analysed according to the thematic analysis method described above. The diary entries were examined for instances in which participants had returned to the websites first introduced during the four-week study session this was regarded as evidence of longer term engagement with the site. The diaries also contained information on the participants' integration of information sources. The structured interviews carried out for the menopause/HRT study were analysed according to the specific questions put to the participants and in terms of emergent themes. Once again a constant comparison method was used in the analysis to ensure that the thematic analysis represented all perspectives.

7. Results

During the free search of week 1 the participants utilised general search engines such as Google and a variety of simple search terms to locate relevant websites. Participants' search strategies varied considerably depending on the individuals' specific interests and became more refined and sophisticated over time (see Sillence et al 2004, Sillence et al, 2004a for more detail). During the hypertension study sessions, for example, most participants began by entering simple search terms such as 'high blood pressure' or 'hypertension' into a search engine. Over the following weeks their searches became more sophisticated with participants making use of explicit Boolean operators (in most cases 'AND'). Participants often chose to explore websites from the first page of results and made use of simple heuristics such as choosing sites they had heard of before or sites with a UK domain.

The data logging revealed that the participants rejected a number of sites within the first few seconds. During this time the effectiveness of rapid heuristic processing of information is noticeable. Within a thirty second window, participants were able to efficiently sift information – recognizing and rejecting general portals and sales sites quickly. This may be because such sites have distinctive design features associated with them, but some content processing is also underway.

Participants discussed their first impressions of a website. There were two factors that led them to reject or mistrust a website quickly. These are summarized in table 5, with numbers included to give an indication of relative importance. The overwhelming

majority of comments related to the design of the website. The look and feel of the website was clearly important to the participants. Visual appeal, plus design issues relevant to site navigation appeared to exert a strong influence on people's first impressions of the site. Poor interface design was particularly associated with rapid rejection and mistrust of a website. In cases where the participants did not like some aspect of the design the site was often not explored.

<table 5 about here>

The participants cited a number of elements associated with sites that they had chosen to explore in more depth. The themes are summarized in table 6. In terms of trust participants suggested that expertise and underlying site motivation were important features of the selected websites. The participants also liked sites that contained a great deal of information but that was presented in such a manner that an individual could quickly pinpoint their own specific areas of interest. Table 6 indicates that content factors were more important than design features in describing trusted or well-liked sites.

<table 6 about here>

The analysis of the group discussion protocols provide support for a staged model of trust wherein design appeal predicted *rejection* (mistrust) and credibility of information and personalisation of content predicted *selection* (trust) of advice sites. In general longer-term engagement was predicted by the presence of personalised content, user generated content and interactive features.

7.1 Testing the specific predictions

Table 7 provides a visual representation of the consumers' actual site engagement. The chart shows that participants engaged with the sites at various levels. Several sites were rejected at the heuristic analysis stage whereas two sites were engaged with over the longer term by at least some of the participants (see hatched area of chart). The chart indicates the stage at which the majority of participants chose to engage with the site. Within the stage of engagement the length of the line indicates the strength of engagement within that stage. The shorter the line the less engagement within that stage. Engagement in this context was determined through examination of the data collected at the different phases of the study. Firstly, the actual length of time spent on the site (as logged automatically). Secondly, the comments in the log book which indicate the extent to which the site was examined and thirdly the post web search discussions. These discussions acted as a valuable source of rich information about the level of engagement with a particular site. The behavioural measures combined with the self-reports are used to represent the level of participants' engagement with the site at various levels. The diaries were also used to judge level of engagement over the longer term. The hatched shading on table 7 represents the fact that not all participants consulted the sites again during the six-month follow up phase.

<Table 7 about here>

7.1.1 Heuristic stage

Heart Center Online: This site was rejected at the heuristic level. Participants did not like the many adverts on the site and found it difficult to navigate. A great deal of the content was only available upon registering but people wanted to be able to browse first, read the articles, and then decide whether or not they wanted to register for further content. Instead the site often gave the participant the first paragraph of an article and then asked for registration before providing the remainder of the article which irritated the participants.

Health A-Z: The site was rejected almost immediately. The home page lacked a clear entry point and the participants found it difficult to see whether the site was appropriate for their needs or even aimed at 'someone like them'. There were too many different navigation mechanisms on the site with the majority leading directly to a registration page. Participants were reluctant to register on the site which lacked clear social identity cues or a clear motivation.

"Lots of American language 'go and visit your physician' I don't have a physician I go to the doctors and it was extremely slow and dowdy as soon as I logged onto it I thought umm this site isn't for me." (Male, 35)

7.1.2 Content evaluation stage

Menopause Matters: Everyone engaged with the menopause matters site beyond the heuristic stage. The site was well liked and the consumers engaged in an in-depth evaluation of the site and its content. The home page had clear entry points and was inviting. However no-one reported a longer-term engagement with the site through the diaries or the follow up interviews.

Solvay healthcare: Once again all the participants engaged with this site beyond the heuristic analysis stage. The site looked professional and was easy to navigate. The content of the site was up to date and interesting however the majority of participants were unhappy with the pharmaceutical ownership of the site.

"That was on the one that I thought was good till I realized that all paths led to HRT and that was the one that turned out to be backed by the drug companies, it was a bit disappointing, but you know I still can't find anything for my personal situation I can't be unique in that I mustn't be but." (Female, 46)

Jabs: Participants engaged with this site just beyond the heuristic evaluation stage. Although the design appeared quite amateurish in design the cues to the content of the site were strong enough to warrant further investigation. However the biased nature of the information was off-putting as was the donation sign. The site was not used in the longer term but this may relate to the nature of the health issue (see section 8 for further discussion).

"I suppose it was interesting in the sense that it was so biased against the MMR its useful to read it I mean but basically it was just a self help group website and so again it was like totally propaganda asking for donations and

this kind of thing that I found it a bit disturbing actually I didn't like it, it was just so one sided I didn't like it.” (Female, 33)

7.1.3 Longer term engagement

The diaries (and the follow up interviews for the menopause/HRT study) indicate that relatively few people had engaged with sites over the longer term. Only a small number of people had registered on the sites or had disclosed personal information. The sites that people had engaged with beyond the end of the study period are reported below.

DIPEX: This site was well liked and trusted. Participants welcomed the reports of personal experiences on the website and were able to identify with the individuals' circumstances. They appreciated the balance between medical and experiential information and advice. The diaries indicate that some participants also engaged with the site over the longer-term. The participants liked the fact that DIPEX provided real patients experiences for comparison and contrast with their own. The participants thought that DIPEX offered information that they simply could not find in more medically oriented sites.

“You can go on and find medical information, but what I want to find out is, you know, people giving reports of, right I've got high blood pressure and I've done this and I've done that and it brought my blood pressure down.”
(Female, 45)

BBC Healthy Living: Although all the participants engaged with this site at the content evaluation stage many people continued to engage with the site after the completion of the four week study. The participants found the site interesting but commented that it would benefit from greater depth and less breadth of content. This aside the site appeared to be a popular way of finding out more about a particular subject in a manageable way.

Additional sites

As well as providing a follow up to a sample of selected sites the diaries and interviews also provide a way of examining all the sites that the participants engaged with over the longer term. Two such examples are described below:

BW took part in the hypertension study. He was taking medication for his high blood pressure and was unhappy with what he saw as the debilitating side effects. Discussions prior to the study had left him frustrated since his doctor had advised him that side effects were very unusual for this medication. BW was convinced his symptoms were not normal. During the sessions he came across one site in particular which detailed other people's experiences of side effects whilst taking this particular medication. This site was Netdoctor (www.netdoctor.co.uk) a site which contains a message board feature. During the group discussions he told every one of his findings and his intention to show these results to his doctor. The diaries indicated that he returned to the website several times and registered on this site in order to post messages to the discussion board. Following this interaction with the site, and in consultation with his doctor, he had agreed a change in his medication.

KK took part in the healthy living study. She was interested in planning a new exercise regime. She looked at ivillage (www.ivillage.co.uk) during one of the free search sessions and liked the interactive features of the website such as the calculators, the alert functions and the large message boards facility. Her diary indicates that she engaged with the site over the longer-term. She registered her details with the site in order to be able to post messages and receive email alerts and reminders concerning her personalised exercise plan.

8. Discussion

This study continues to provide evidence for a staged model of trust in which visual appeal influences early decisions to reject or mistrust sites, whilst credibility and personalisation of information content influences the decision to select or trust them. Although consumers report a desire for high quality content it is often the case that once online searching commences, consumers are often overloaded with the sheer volume of results. They have to make use of some simple heuristics, involving low cognitive effort, based on visual appeal to sift out and reject poor sites (Sillence et al, 2004a; Peterson et al, 2003). The sites that they then choose to engage with and act upon are once more related to issues of content and quality. As trusting relationships develop over the longer term factors such as personalisation, interactivity and user generated content become increasingly important.

The framework, based upon the staged model of trust, proved to be a useful tool accurately predicting to a large extent the sites that would be trusted at each stage. The framework was most accurate at predicting rejection at the heuristic stage. It correctly predicted which sites people would mistrust at a very early stage and reject without any further engagement. The importance of the heuristic stage cannot be underestimated and emphasises the importance of designers providing the right clues to content on the homepage of a website. Some health portals have recognised the importance of design issues in developing trust. They have chosen to build the most user friendly website as a way of improving the trustworthiness of the portal as opposed to focusing purely on the best medical content (Luo & Najdawi, 2004). If a homepage is not clearly laid out and easy to navigate then people will not want to engage with the site any further. It is interesting to note that experts are often somewhat dismissive of the importance of design features in trust and credibility decisions but these issues are obviously key for initial trust. Rather than viewing design issues as shallow they should be perhaps regarded as an important feature with real implications. If people cannot move beyond the poor design then the quality of the content becomes irrelevant.

As predicted the participants in our study, with a greater stake in the outcome of their web searches, paid close attention to the content of selected sites and were careful and critical evaluators of the information. Sites that passed the initial heuristic evaluation stage were then evaluated in terms of their content and quality. The discussions revealed that the important dimensions in terms of trust related to site purpose and issues of content level and source knowledge. At this stage participants engaged with sites such as menopause matters and MMR the facts. Participants found that these sites were in-depth, covered a range of issues and were useful both to the novice and the expert information seeker. The framework was less robust when it came to

predicting longer-term site engagement. The absence of truly personalised content on the BBC's healthy living site meant that longer-term engagement with the site was not predicted by the framework. Despite this the site was well liked over the longer term. It may be that this kind of portal site can be used in a different way over the longer-term. The sheer size of the site and the breadth if not depth of its content made it a very useful resource that participants dipped into as necessary. The site also contained updated content and interactive quizzes and participants found it useful as a reference point that they could return to when recommencing a search for advice. The fact that participants engaged with the site over the longer term across a range of issues might relate to the site's reputation. The BBC's healthy living site was also one of the sites with strong branding (see table 4). Branding is an indicator of reputation. Reputation and reputation mechanisms have been shown to promote the formation of trust in online settings (Resnick, Zeckhauser & Friedman, 2000). The framework for trust suggests that reputation exerts a stronger effect on trust during the initial stages of engagement. Comments during the discussion groups support this proposition. Participants made certain assumptions about the trustworthiness of a website like the BBC's site prior to examining the site in any depth. It may be that participants revert to relying upon the reputation of a site when searching afresh for a new topic related to healthy living.

The data from the diaries and the follow up interviews suggested that reputation and recommendation were used as either a starting point for a search or as a mechanism for screening the results of a search when the participants were conducting free searches (as opposed to engaging with the specific sites of interest for this study). The results of a large-scale survey examining online health advice, however, suggest that general search engines rather than recommendation or reputation are still the most common starting points for locating information and advice (Sillence et al, under review).

In general people wanted personalised advice but thought that currently it was difficult to obtain online. Participants suggested that they would be prepared to disclose more personal information in return for personalised advice. However, the nature of the personal information was important in this respect. Very few of the participants wanted to subscribe to any of the sites or to register their contact details. The main consideration appeared to be whether or not there was some value to the participant themselves in registering their details. As previously mentioned one participant in the high blood pressure study registered with Netdoctor in order to be able to post messages to the site. The Netdoctor site, although not one of our selected sample does upon analysis appear to contain many of the framework features associated with longer term engagement. The site is regularly updated and the message boards contain very specific, personalised information and advice which allowed one participant in particular to return to his doctor and discuss a change of medication. In the case Netdoctor and also iVillage it is clear that the participants believed in the benefits of registering on the website. Both these sites allowed participants to 'view' the benefits of registering before deciding whether to disclose their personal information. This is in stark contrast to the frustrations experienced with the Heart Center Online site which allowed participants to read half an article before informing them that they needed to register in order to read the remainder. It appears that personalised advice and information can come from one of two sources. Site led personalised information and advice in the form of specific, personalised

alerts or health plans and member-led personalised information via the discussion boards. Registration is a feature of both these forms of personalisation and some people are more prepared to self disclose for one form over another.

Usefulness of framework

Whilst the framework was useful in terms of predicting people's attitudes towards and their trust in certain sites at a given moment in time, how useful would it be over time and is it a universal framework? People's needs change as their health conditions alter. This means that their motivations for searching online change as do their information requirements. As experience increases over time, patients become more expert regarding their own conditions. In turn this may mean that sites previously considered useful and acceptable at the content evaluation stage may now be rejected if the content is no longer tailored to the patient's needs. The information and advice, for example, may now be considered too basic. Certain health conditions have acute implications whilst others chronic implications. This means that in some cases once advice has been sought and a decision made engagement with sites can cease altogether. This was shown to be the case with the MMR follow up diaries. Once a decision to vaccinate had been taken and implemented the participants avoided looking at any MMR related websites. In the case of the menopause and HRT participants' health circumstances altered and they reviewed their decisions and sought different kinds of online advice accordingly. Whilst the framework suggests that certain trust dimensions fall neatly into discrete stages this is not always the case. The significance attached to the site's purpose may also change over time. The site's purpose is an important trust dimension considered during the content evaluation stage. However, it may need to be re-evaluated once a longer-term relationship has developed for example in response to some advice on the site itself or a new source of information regarding the site.

It is interesting to note that the purpose or intention of the website is far more important to consumers in the health domain than was initially anticipated. Fogg et al (2001) found that commercial implications including whether the site has a commercial rather than academic purpose, reduced perceptions of credibility. The dislike for commercialism and for unbiased information within sites appeared to be a stronger factor in the health domain. British users in particular are unfamiliar with the medicine-commerce link and find it an uncomfortable mix. Most participants showed some distrust of the advice and information on websites sponsored by pharmaceutical companies or those explicitly selling products although other kinds of sponsors were acceptable. The Solvay health care site was well liked by the participants of the menopause and HRT study until the site's pharmaceutical sponsorship was discovered. This is interesting given that medical reviews of health information online recommended pharmaceutical sites as providing the most accurate information on this topic (Reed & Anderson, 2002). Two other dimensions of the framework also appeared to be particularly pertinent within a health context. These were social cues and expertise. During the free searches several high credibility, high quality sites were rejected at the heuristic stage because they lacked sufficient social cues and cues to content. In addition to medical expertise participants also rated highly the expertise displayed by patients and carers. As an indicator for trust this differs from traditional quality indicators of online health information.

The findings from the group discussions also suggest that the development of trust through the three main stages outlined in Figure 1 may not always be the linear process that the model implies. If, for example, a site has been recommended by a friend or some other trusted person then the information seeker might well rely on the 'recommendation heuristic' rather than the more common design heuristics employed. This means the participant would be prepared to simply trust a site initially on the basis of a friend's recommendation and ignore design features or the overall look and feel of the site.

In addition to personal motivations for searching online for health advice, individuals bring with them to the evaluation process different levels of background knowledge and expertise. The effects of these individual differences or personal preferences are most strongly felt at the content evaluation stage. Here they can impact upon most noticeably source knowledge, content level and language style and tone. So, for example, some people felt comfortable with the discussion boards and wanted to engage with them whilst others shied away. The presentation of material concerning, for example, risk information will be differentially attractive to health information seekers with different cognitive styles. Research has shown that message framing affects perceptions of risk information and that message style differentially affects people depending on their cognitive style (Edwards, Elwyn, Covey, Matthews & Pill, 2001). Consumers may be more likely to respond emotionally, cognitively and behaviourally to messages tailored to match the ways that they typically process health information (Miller, 1987).

9. Conclusions and future work

The framework was generally accurate at predicting the majority of peoples' rejection and selection patterns. The complexities regarding health change over time made the predictions regarding longer-term engagement less robust. However, many of the sites that people visited over the six months possessed the trust dimensions for the third stage of the model. Future work will concentrate on further validation of the framework and subsequent modification. This will take the form of a large-scale quantitative survey and an experimental phase. Sites identified as being poor or untrustworthy will be altered in accordance with the framework guidelines and then presented to health consumers for assessment. Understanding why online consumers are prepared to engage with some sites and not others is an issue of critical importance to site developers in any profession. This paper has demonstrated the importance of certain trust dimensions with respect to these engagement decisions.

Acknowledgements

This work is supported by a grant from the ESRC's E-society programme.

References

- Albarracin, D. & Kumkale, G., T. (2003). Affect as Information in Persuasion: A Model of Affect Identification and Discounting, *Journal of Personality and Social Psychology*, 84, 3, 453-469.
- Bhattacharjee, A. (2002). Individual Trust in Online Firms: Scale Development and Initial Test. *Journal of management Information Systems*, 19,1, 211-241.
- Briggs, P., Burford, B., De Angeli, A. & Lynch, P. (2002). Trust in Online Advice, *Social Science Computer Review*, 20, 3, 321-332.

- Briggs, P., de Angeli, A. and Simpson, B. (2004). Personalisation and Trust: A Reciprocal Relationship? In M.C. Karat, J. Blom and J. Karat (Eds). *Designing Personalized User Experiences for E-Commerce*. Kluwer.
- Burkell, J. (2004). Health Information Seals of Approval: What do they Signify? *Information, Communication & Society*, 7 (4), 491-509.
- Carvel, J. (2005). Lack of information worries NHS patients. *The Guardian*. February 21, 2005, p.10
- Chaiken, S. (1980). Heuristic versus systematic information processing and the use of source versus message cues in persuasion. *Journal of Personality and Social Psychology*, 39, 752-766.
- Chen, S. & Chaiken, S. (1999). The Heuristic-Systematic Model in Its Broader Context. In S. Chaiken & Y. Trope (Eds.), *Dual-process theories in social psychology* New York: Guilford Press, 73-96.
- Cheskin Research and Studio Archetype/Sapient (1999). Ecommerce trust study. Retrieved (July 16, 2003) from: <http://www.cheskin.com/p/ar.asp?mlid=7&arid=40&art=0&isu=1>
- Childs, S. (2004). Developing health website quality assessment guidelines for the voluntary sector: outcomes from the Judge Project. *Health Information and Libraries Journal*, 21 (2) pp14-26.
- Corritore, C. L., Kracher, B. & Wiedenbeck, S. (2003). On-line trust: concepts, evolving themes, a model. *International Journal Human-Computer Studies*, 58, 737-758.
- Derbas, G. Kayssi, A. Artail, H. & Chehab, A. (2004). TRUMMAR: A Trust model for mobile agent systems based on reputation. In *Proceedings of IEEE/ACS Int. Conference on Pervasive services (ICPS'04)* pp.113-120.
- Edwards, A., Elwyn, G., Covey, J., Matthews, E. & Pill, R. (2001). Presenting risk information – a review of the effects of ‘framing’ and other manipulations on patient outcomes. *Journal of health communication*, volume 6 pp. 61-82.
- Egger, F.N. (2000). "Trust Me, I'm an Online Vendor": Towards a Model of Trust for E-Commerce System Design. *Proc. CHI 2000*. ACM Press.
- Egger, F.N. (2001). Affective Design of E-Commerce User Interfaces: How to Maximise Perceived Trustworthiness. *Proc CAHD: Conference on Affective Human Factors Design*, 317-324.
- Eysenbach, G. (1999). Online prescribing of sildenafil (viagra). *J Med Internet Research* 1(2): e10
- Eysenbach, G. and Köhler, C. (2002). How do consumers search for and appraise health information on the world wide web? Qualitative study using focus groups, usability tests, and in-depth interviews. *British Medical Journal* 324 , 573-577.
- Eysenbach, G. Powell, J., Kuss, O., and Sa, E-R. (2002). Empirical studies assessing the quality of health information for consumers on the world wide web, a systematic review. *Journal of the American Medical Association* 287, 20, 2691-2700.
- Fogg, B. J., Kameda, T., Boyd, J., Marchall, J., Sethi, R., Sockol, M. and Trowbridge, T. (2002). *Stanford-Makovsky Web Credibility Study: Investigating what makes Web sites credible today*, A Research Report by the Stanford Persuasive Technology Lab
- Fogg, B. J., Marshall, J., Laraki, O., Osipovish, A., Varma, C., Fang, N., Paul, J., Rangnekar, A., Shon, J., Swani, P. & Treinen, M. (2001). What Makes Web

- Sites Credible? A Report on a Large Quantitative Study, *Proceedings of CHI 2001, March 31- April 4, Seattle* New York: ACM Press.
- Fox, S. & Fallows, D. (2003). Internet Health Resources: Health searches and email have become more commonplace, but there is room for improvement in searches and overall Internet access. Pew Internet Research. Available at: <http://www.pewinternet.org>
- Grabner-Krauter, S. and Kaluscha, E.A. (2003). Empirical research in online-trust: a review and critical assessment. *International Journal of Human-Computer Studies*, 58, 783-812.
- Griffiths, K. M. & Christensen, H. (2000). Quality of web based information on treatment of depression: Cross Sectional Survey. *BMJ* 321(7275) 1511-1515.
- Kalet, A, Roberts, J.C. & Fletcher, R. (1994). How do physicians talk with their patients about risks? *Journal of General Internal Medicine*, 9, 402-404.
- Klein, J.D and Wilson, K.M. (2003). Delivering quality care: adolescents' discussion of health risks with their providers. *Journal of adolescent health*, 30(3), 190-195.
- Luo, W. & Najdawi, M. (2004). Trust building measures: A review of consumer health portals. *Communications of the ACM* 47 (1): 108-113.
- Marsh, S., Briggs, P., Wagealla, W. "Considering Trust in Ambient Societies," International Conference for Human-Computer Interaction (CHI 2004) Extended Abstracts. Vienna, Austria. April 24-29, 2004.
- Mead, N., Varnam, R., Rogers, A. & Roland, M. (2003). What predicts patients' interest in the Internet as a health resource in primary care in England? *Journal of Health Services Research and Policy*, 8 (1) 33-39.
- Miller, S. M. (1987), Monitoring and blunting: Validation of a questionnaire to assess styles of information seeking under threat. *Journal of personality and social psychology*, 52, 345-353.
- McAllister, D.J. (1995). Affect-Based And Cognition-Based Trust As Foundations For Interpersonal Cooperation In Organizations *Academy Of Management Journal* 38,1, 24-59.
- McKnight, D. H. and Chervany, N.L. (2001). Trust and Distrust Definitions: One Bite at a Time. In R. Falcone, M. Singh and Y.-H. Tan (Eds.) *Trust in Cyber-societies*. Berlin: Springer-Verlag.
- Murray, K. (2001). Analyzing web sites or the hidden risks of medical web sites. Paper presented at the 25th International Congress of the medical womens' International association. Available online at: http://mwia.regional.org.au/papers/papers/08_murray.htm
- Nielsen, J., (1999). Trust or Bust: Communicating Trustworthiness in Web Design. AlertBox available online at: <http://www.useit.com/alertbox/990307.html>
- Olson, G.M., Olson, J.S., (2000a). Distance matters. *Human-Computer Interaction* 15 (2&3), 139-178.
- Peterson, G., Aslani, P., & Williams, K. A. (2003). How do Consumers Search for and Appraise Information on Medicine s On the Internet? A Qualitative Study Using Focus Groups. *Journal of Medical Internet Research* 5(4) e33.
- Petit-Zeman, S. (2004). Surf yourself better. *The Guardian*. Tuesday December 7th 2004.
- Petty, R.E. and Wegener, D. T. (1999). The elaboration likelihood model: Current status and controversies. In S. Chaiken & Y. Trope (Eds.), *Dual-process theories in social psychology* New York: Guilford Press, 41-72.

- Pew Research Center. (2000) *The online health care revolution: How the Web helps Americans take better care of themselves*. Available at:
<http://www.pewinternet.org>
- Reed, M. and Anderson, C. (2002). Evaluation of patient information Internet web sites about menopause and hormone replacement therapy. *Maturitas* 43, 135-154.
- Resnick, P., Zeckhauser, R., Friedman, E., Kuwabara, K. (2000). Reputation Systems. *Communications of the ACM* 43 (12) 45-48.
- Riegelsberger, J., Sasse, M. A. & McCarthy, J. D. (2005). The Mechanics of Trust: A Framework for Research and Design. *International Journal of Human-Computer Studies*, 62(3), 381-422
- Riegelsberger, J., Sasse, M. A., & McCarthy, J. (2003). Shiny happy people building trust? Photos on e-commerce websites and consumer trust. *Proceedings of CHI2003*, April 5-10, Ft. Lauderdale, FL., USA. New York: ACM Press.
- Rozmovits, L. & Ziebland, S. (2004). What do patients with prostate or breast cancer want from an Internet site? A qualitative study of information needs. *Patient Education and Counselling*; 53: 57-64.
- Schneiderman, B. (2000). Designing trust into online experiences, *CACM* 43(12), pp. 57-59
- Shon, J., Marshall, J. & Musen, M. A. (2000). The impact of displayed awards on the credibility and retention of web site information. In *Proc AMIA Symp*, 794-798.
- Sillence, E., Briggs, P. Herxheimer, A. (2004). Personal experiences matter: What patients think about hypertension information online. *He@lth Information on the Internet*, 42 December, p3-5.
- Sillence, E., Briggs, P., Fishwick, L. & Harris, P. (2004a). Trust and Mistrust of Online Health Sites. *Proceedings of CHI'2004*, April 24-29 2004, Vienna Austria, p663-670. ACM press.
- Sillence, E., Briggs, P., Fishwick, L. & Harris, P. (2004c). Timeline analysis: A tool for understanding the selection and rejection of health websites. In A. Dearden & L. Watts (Eds.) *Proceedings Volume 2 of the conference HCI 2004: Design for Life*. Leeds, UK, September 6th-10th p.113-116.
- Sillence, E., Briggs, P., Fishwick, L. & Harris, P. (2004b). What Parents Make of MMR and the Internet. *He@lth Information on the Internet*, 39, June 2004 p5-6.
- Sillence, E. & Briggs, P. (in press). Please Advise: Using the Internet for financial and health advice.
- Sillence E., Briggs, P., Harris, P. & Fishwick, L. (under review). Changes in online health usage over the last 5 years. Paper submitted to CHI'2006.
- Smart, J M and Burling, D. (2001). Radiology and the Internet: a systematic review of patient information resources, *Clinical Radiology*, 56(11), 867-870
- Stanford, J., Tauber, E., Fogg, B.J. and Marable, L. (2002). Experts vs. Online Consumers: A Comparative Credibility Study of Health and Finance Web Sites. *Consumer Web Watch Research Report* (2002). Available at
http://www.consumerwebwatch.org/news/report3_credibilityresearch/slicedbread_abstract.htm
- Walther, J. B., Wang, Z. & Loh, T. (2004). The effect of top-level domains and advertisements on health web site credibility. *J Med Internet Res* 6(3):e24.
- Wang, Y. D. & Emurain, H. H (2005). An overview of online trust: Concepts, elements and implications. *Computers in Human Behavior*, 21, 105-125.

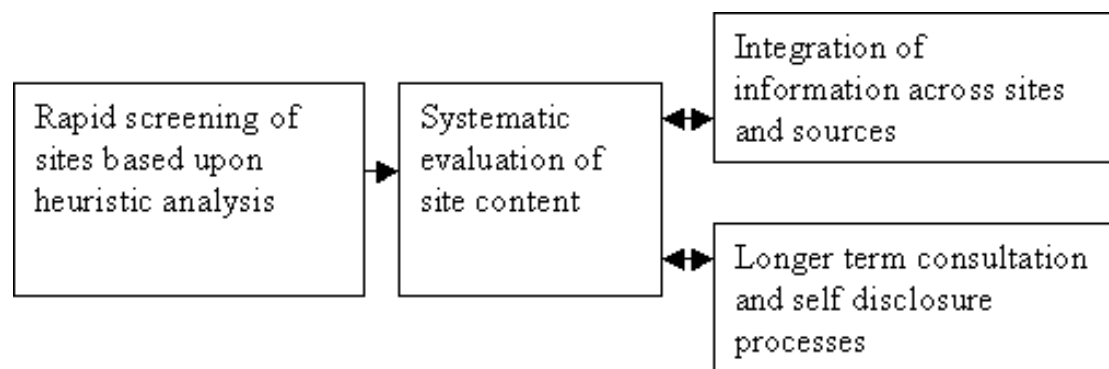


Figure 1: The staged model of trust

Table 1: The range of health websites available to consumers

Type of site	Description of site
Web providers and portal sites	Information and advice supplied by web provider rather than a physical organisation. Portals act as catalogues of information providing a gateway to many other sites providing information and advice.
Support groups	Often run by individuals or on behalf of support groups. May be local, national or global in scale. Often contains forums where consumers can read comments and contribute to discussions.
Charity sites	Registered charity sites provide information and advice on specific health issues and provide a focal point for fund raising activities.
Government websites	Provide patient information in the form of news, features and fact sheets.
Pharmaceutical sites	Sponsored by pharmaceutical companies these sites are often biased in favour of their own drug remedies and regimes.
Sales sites	Sales sites promote and sell certain drugs, medical devices or health plans often in addition to some information.
Personal sites	Contains personal experiences of illnesses and health issues.
Medical databases	Provide access to research papers on health and illness issues.
Media sites	Extensions of print or television media sites that provide the latest news and commentary on health features
Clinician sites	Information on specific health issues or specialist clinics run by medical professionals

Table 2: Trust dimensions used to describe health websites, together with value ranges

<p><i>Heuristic</i></p> <p><i>Visual appeal:</i> Text/graphics balance, poor/good use of colour</p> <p><i>Layout/navigation:</i> One bar menu, multiple menu bars, clear entry points, embedded links, site map</p> <p><i>Social identity cues:</i> Present on front page, present elsewhere, no cues present</p> <p><i>Advert:</i> None, few, many</p> <p><i>Brand:</i> Strong branding, moderate branding, little or no branding</p>
<p><i>Site content evaluation</i></p> <p><i>Language style and tone:</i> Medical technical, formal or professional, informal or personal.</p> <p><i>Site motivations:</i> Clear, unclear, charity, commercial, pharmaceutical, information provider, share experiences and ideas</p> <p><i>Content level:</i> Surface, intermediate, advanced information</p> <p><i>Source knowledge:</i> Expert knowledge (medical or technical), experiential knowledge, unspecified</p> <p><i>Cross referencing:</i> No external links, few links or broken links, many external links</p>
<p><i>Longer term engagement: through source integration and self-disclosure processes</i></p> <p><i>Personalised content:</i> Generic content, moderately personalised content, highly personalised content, varying degrees of registration requirements</p> <p><i>Interactivity:</i> Email updates, text updates, quizzes, tools, newsletters, chat circles, expert questions</p> <p><i>Updated content:</i> Static site, regular updates of existing content, new features and content added regularly</p> <p><i>User generated content:</i> No message facility, read without registering, post without registering, register to read, register to post, register to post only</p>

Figure 2: DIPEX high blood pressure homepage



PERSONAL EXPERIENCES OF HEALTH & ILLNESS

[Home](#) | [Experiences](#) | [Forum](#) | [News](#) | [Help!](#) | [Contact Us](#)

High Blood Pressure

INTRODUCTION

EXPERIENCES

- TALKING ABOUT
- INDIVIDUALS

INFORMATION

Q & As

RESOURCES

GLOSSARY

CREDITS

Hypertension

We have interviewed 18 people to find out their experiences of this condition. To find out about the various issues that affect people with this condition, click on the links below.

[Talking about ...](#)

[Discovery](#)

[Treatment](#)

[Living With It](#)

[Q & As](#)

Is it worth taking tablets?

[find out more.](#)

[Individuals ...](#)

[view](#)

[Information](#)

Headaches and high blood pressure

[find out more.](#)



Video introduction from Geoff Watts.
[Watch it.](#)

[Make a donation](#)



[Quick search](#)

or alternatively, try the advanced search page ...
[Advanced Search](#)

[Glossary](#)

Know what you're looking for? [Try](#) the glossary of hundreds of terms.

Last updated: June 2004 © Dipex MMI

[DIPEX is a registered charity no. 1087019 and a company limited guarantee no.4178865]

Table 3: Main features of the health websites

Site	Domain	Ownership	Advice	UK based	Commercial aspects	Notable features
Heart center online	High blood pressure	Web provider	Articles Fact sheets Tools and quizzes	No	Yes – banner ads & sponsored newsletters	Registration required for full articles
DIPEX	High blood pressure	Charity	Personal accounts Medical info FAQ	Yes	Donation button	Video clips Links to support groups Donation button
Menopause matters	Menopause	Web provider – clinician led	Fact sheets Q& A Decision tree	Yes	No	Discussion boards
Solvay health	Menopause	Pharmaceutical	News Decision trees Polls	Yes	Implicit (site ownership)	Links to support groups
MMR the facts	MMR	Government	Latest news Research reports Q&A	Yes	No	Order video materials Links to other websites
Jabs	MMR	Support group	News Research Questionnaires	Yes	Donation button	Discussion boards
BBC healthy living	Healthy living	Media	Features and commentary Quizzes	Yes	No	Discussion boards Subscribe to newsletter
Health A to Z	Healthy living	Web provider	Features and commentary Interactive tools	No	No	Health management tools Membership benefits HON code

Type of factor	Specific aspects of the site	Weighting (see legend)
Design	Inappropriate name for the website Complex, busy layout Lack of navigation aids Boring web design especially use of colour Pop up adverts Slow introductions to site Small print Too much text Corporate look and feel Poor search facilities/indexes	89%
Content	Irrelevant or inappropriate content	11%

Table 5: Factors relating to the rejection and mistrust of websites. The final column shows the number of times a factor was mentioned as a percentage of the total number of comments about rejection.

Type of factor	Specific aspects of the site	Weighting
Design factors	Clear layout Good navigation aids Interactive features e.g. assessment tools	20%
Content Factors	In-depth information Expert information Relevant illustrations Wide variety of topics covered Unbiased information Personalised information Clear, simple language used Discussion groups Frequently asked questions	80%

Table 6: Positive features about selected, trusted sites

	Stage of engagement											
	Heuristic analysis				Content evaluation				Longer term engagement			
Menopause matters												
Solvay healthcare												
Heart Center Online												
DIPEx												
MMR the facts												
JABS												
Health A-Z												
BBC healthy living												

Table 7: Participants overall stage of engagement with the website

	Heuristic analysis					Site evaluation					Longer term engagement			
	Balance	Layout	Social identity cues	Advert	Brand	Style & tone	Motivation	Content	Knowledge	Cross ref.	Pers. content	Interact	Updated content	User generated content
Heart Center Online	Good	3 menus search no home	Present elsewhere	Many	Mod	Formal	Clear commercial	Intermed	Expert	Many sponsor	Moderate (register)	Tools Quizzes Expert Q & A	Regular updates	Register to read and post
DIPEx	Good	2 menus and click here to enter	Present elsewhere	None	Mod	Informal	Clear charity Experiences, information	In-depth	Experiential (1) Expert	Many	Moderate	Get involved	New content	Register to post only
Menopause matters	Good	L hand menu Search tool	Front page	Few	Little	Prof	Clear information provider	Intermed	Expert (1) Experiential	Few links	Generic	None	Reg updates	Register to post only
Solvay healthcare	Good	L & R hand menus	Front page	None	Mod	Formal	Not clear pharmaceut	Surface	Unspecified	Few	Generic	Letters (edited) Poll	Updated headline	No facility
MMR the facts	Good	Top bar menu Search home	Front page	None	Strong	Formal	Clear, information provider	In-depth	Specified, expert	Few	Generic	Expert Q & A	Today's date Updated news	No facility
Jabs	Mainly text	L hand menu	Present elsewhere	None	Little	Informal	Clear Experiences	In-depth	Unspecified	Few	Generic	Email local contact Question naire	Updated news	Read and post with email only
Health A-Z	More graphics than text	Top bar menu A-Z scroll bar	Present elsewhere	None	Mod	Informal	Not clear Information provider	Intermed	Expert	Few	Moderate (register)	Tools Quizzes	Updated news	Service suspended
BBC healthy Living	Good	L hand menu and centre	No	None	Strong	Informal	Clear information provider	Surface	Unspecified	Many	Generic	Some limited tools	Regular updates	Register to post

Table 4: Health sites reviewed in terms of the framework dimensions

